ABSTRACT OF THE DISCLOSURE

The present invention provides a system that controls the amount and timing of pilot fuel injection to obtain minimum NO_x and UHC emissions. The system senses if combustion occurs, when combustion occurs, and/or the quality of combustion in the combustion chamber of each cylinder of the gaseous fuel engine and adjusts the amount and/or timing of the pilot fuel injected. The minimum amount of pilot fuel needed to ignite gaseous fuel in a combustion chamber is determined and injected into the prechamber or the combustion chamber of the engine. The actual start of combustion location is determined and the injection timing is adjusted if the start of combustion location is not approximately equal to a desired location. The amount of pilot fuel or injection timing is adjusted if a knock or a misfire has occurred or if the combustion quality measure is not approximately equal to a desired quality measure.